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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,498	08/24/2001	Vivek Subramanian	10519/30	3758

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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60611

EXAMINER

VU, DAVID

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/939,498

Applicant(s)

SUBRAMANIAN ET AL.

Examiner

DAVID VU

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 95-115 is/are pending in the application.
- 4a) Of the above claim(s) 106 and 111 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 95-100 and 107-115 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,7,10-11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/ Restriction

1. Application's election without traverse of Group I (Claims 95-100 and 107-115) in Paper No.9 is acknowledge.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 111 recites the limitation " wherein the step of forming a steering element " on page 4. There is insufficient antecedent basis for this limitation in the claims. Thus the claim is vague and indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the

United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international

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application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 95 and 97-100 are rejected under 35 U.S.C. 102(e) as being anticipated by McCollum et al.,(US 5,763,299).

McCollum et al., in related text (Col. 5, Lines. 25-33 and Col. 3, Line 59-Col. 4, Line 3) and figures (Fig. 2) disclose a process for fabricating a state change element in a 3-D semiconductor memory device comprising the steps of. forming a semiconductor layer 20; and oxidizing at least a portion of the semiconductor layer 20 in a plasma to form an oxide antifuse layer 18 overlying the semiconductor layer 20.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 107, 109-110 and 112-115 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCollum et al., (US 5,763,299) in view of Hart et al., (US 5,970,372).

McCollum et al., in related text (Col. 5, Lines. 25-33 and Col. 3, Line 59-65; Col. 7, Line 58-Col. 8, Line 9 and Col. 6, Line 43-50) and figures (Figs. 2 and 4a) disclose a process for fabricating a cell in a 3-D semiconductor memory device comprising: forming a stacked antifuse material structure 24 comprising silicon nitride layer 16, a layer of amorphous silicon 20, a silicon dioxide layer 18 and a silicon nitride layer 22, in which the oxide layer 18 is formed by plasma oxidation in O₂; forming a conductor layer 28 overlying the stacked antifuse material structure 24; and sequentially etching a conductor layer 28 and a stacked antifuse material structure 24.

McCollum et al., disclose all claimed subject matter, but fails to expressly disclose forming a second semiconductor layer overlying the oxide layer.

Hart et al., in related text (Col. 9, Lines 49-62; Col. 7, Lines 3-15 and Col. 13, Line. 41-Col. 14, Line. 30) and figure (Fig. 2) disclose a process for fabricating a multiplayer amorphous silicon antifuse device comprising: forming a first conductor layer 102; forming a first semiconductor layer 201 overlying the conductor layer 102; oxidizing at least a portion of the first semiconductor layer in a plasma to form an oxide layer 202 thereon; forming a second semiconductor layer 203 overlying the oxide layer 202; forming a second conductor layer 101 overlying the second semiconductor layer 203.

However, given the substantial McCollum et al., in view of Hart et al., it would have been obvious to one with ordinary skill in the art at the time of the invention to have substituted a functionally equivalent stacked antifuse material structure such as taught by Hart et al. in place

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of the stacked antifuse material structure in the McCollum et al. device, because it would reduce the variability in the amount of voltage required to program the antifuse (See Hart et al, Col. 7, Lines 3-15 and Col. 8, Lines 18-20) .

5. Claims 97 and 108 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCollum et al., (US 5,763,299) in view of Miyasaka (US 6,444,507).

McCollum et al., disclose all claimed subject matter, but fails to expressly disclose the temperature of the oxidation process.

Miyasaka et al, in related text, (Col. 25, Line 63-Col. 26, Line 55) disclose the step of oxidizing at least a portion of the first semiconductor layer comprises plasma oxidation at a temperature of about 150-450°C.

However, given the substantial McCollum et al., in view of Miyasaka et al, it would have been obvious to one with ordinary skill in the art at the time of the invention to judiciously adjust and control the temperature of the oxidation process through routine experimentation and optimization to achieve optimum benefits (see MPEP 2144.05) and it would not yield any unexpected results.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (703) 305-0391. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm.

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If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms., can be reached on (703) 308-4910.

DV

David Vu



HOAI HO
PRIMARY EXAMINER